CLAIMS

1. (Currently amended) An apparatus for applying compensation to samples received from an optical channel comprising at least one optical fiber, the apparatus comprising:

an equalizer having an equalizer response spectrally shaping the samples for compensation to generate a sequence of equalized samples;

an error generator generating an error for a current sample based on the difference between 1) an equalized current sample and 2) a decision for the current sample adjusted for a target response, wherein the target response is based on a response of the at least one optical fiber channel; and

a combiner configured to combine the error with one or more samples to provide an update signal, wherein the equalizer employs the update signal to adjust the equalizer response to the target response.

2. (Original) The invention as recited in claim 1, further comprising a maximum likelihood sequence estimation (MLSE) detector, the MLSE detector generating decoded data from the sequence of equalized samples.

3. (Original) The invention as recited in claim 2, wherein the MLSE detector generates decoded data with an algorithm having transitions based on the target response.

4. (Original) The invention as recited in claim 3, further comprising an accumulator configured to accumulate the square of each error value, wherein the accumulation of the squared error values relates to a parameter of the target response, and the algorithm adjusts its transitions by adaptation of the parameter of the target response.

5. (Original) The invention as recited in claim 1, wherein the equalizer comprises a filter defined by a set of filter taps.

6. (Original) The invention as recited in claim 5, wherein the set of filter taps are adapted in accordance with a recursive update rule, wherein the update rule is generated from a cost function.

7. (Currently Amended) The invention as recited in claim 6 [[5]], wherein the cost function is quadratic error and the update rule is generated from minimizing mean squared error of the cost function with respect to the filter tap.

8. (Original) The invention as recited in claim 5, wherein the target response is of the form A+D, where A is a parameter ranging from about 0 to about 1, and D is a unit delay.

9. (Original) The invention as recited in claim 1, further comprising an accumulator configured to accumulate the square of each error value, wherein the accumulation of the squared error values relates to a parameter of the target response, and the apparatus adapts the parameter of the target response during initialization of the apparatus.

10. (Original) The invention as recited in claim 1, wherein the equalization applied to the current sample accounts for differential group delay of a signal passing through a single mode fiber.

11. (Original) The invention as recited in claim 1, wherein the apparatus is embodied in an integrated circuit.

12. (Original) The invention as recited in claim 1, wherein the apparatus is implemented in a receiver of an optical communication terminal.

13. (Currently Amended) A method of applying compensation to samples received from an optical channel <u>comprising at least one optical fiber, the method</u> comprising the steps of:

 (a) spectrally shaping, with an equalizer, the samples for compensation to generate a sequence of equalized samples;

 (b) generating an error for a current sample based on the difference between 1) an equalized current sample and 2) a decision for the current sample adjusted for a target response, wherein the target response is based on a response of the <u>at least one</u> optical <u>fiber</u> ~~channel~~;

 (c) combining the error with one or more samples to provide an update signal; and

 (d) updating the equalizer with the update signal to adjust the equalizer response to the target response.

14. (Original) The invention as recited in claim 13, further comprising the step of (e) generating decoded data from the sequence of equalized samples with maximum likelihood sequence estimation (MLSE) detection.

15. (Original) The invention as recited in claim 14, wherein step (e) generates decoded data with an algorithm having transitions based on the target response.

16. (Original) The invention as recited in claim 15, further comprising the steps of accumulating the square of each error value, wherein the accumulation of the squared error values relates to a parameter of the target response, and adjusting its transitions by adaptation of the parameter of the target response.

17. (Original) The invention as recited in claim 13, wherein step (a) comprises the step (a1) of filtering based on a set of filter taps.

18. (Original) The invention as recited in claim 17, wherein step (a1) includes the step of adapting the set of filter taps in accordance with a recursive update rule based on a cost function.

19. (Original) The invention as recited in claim 18, wherein the cost function is quadratic error and the update rule is generated from minimizing mean squared error of the cost function with respect to the filter tap.

20. (Original) The invention as recited in claim 17, wherein, for step (b) the target response is of the form A+D, where A is a parameter ranging from about 0 to about 1, and D is a unit delay.

21. (Original) The invention as recited in claim 13, further comprising the steps of: accumulating the square of each error value, wherein the accumulation of the squared error values relates to a parameter of the target response, and adapting the parameter of the target response during initialization of the apparatus.

22. (Original) The invention as recited in claim 13, wherein for step (a), the compensation applied to the current sample accounts for differential group delay of a signal passing through a single mode fiber.

23. (Original) The invention as recited in claim 13, wherein the method is embodied in a processor of an integrated circuit.

24. (Original) The invention as recited in claim 13, wherein the method is embodied in a receiver of an optical communication terminal.

25. (Currently Amended) A computer-readable medium having stored thereon a plurality of instructions, the plurality of instructions including instructions which, when executed by a processor, cause the processor to implement a method for applying compensation to samples received from an optical channel comprising at least one optical fiber, the method comprising the steps of:
(a) spectrally shaping, with an equalizer, the samples to generate a sequence of equalized samples;
(b) generating an error for a current sample based on the difference between 1) an equalized current sample and 2) a decision for the current sample adjusted for a target response, wherein the target response is based on a response of the at least one optical fiber channel;
(c) combining the error with one or more samples to provide an update signal for each tap of the equalizer; and
(d) updating the equalizer with the update signal to adjust the equalizer response to the target response.

26. (New): An apparatus for applying compensation to samples received from an optical channel comprising:
an equalizer having an equalizer response spectrally shaping the samples for compensation to generate a sequence of equalized samples;
an error generator generating an error for a current sample based on the difference between 1) an equalized current sample and 2) a decision for the current sample adjusted for a target response, wherein the target response is based on a response of the optical channel;
a combiner configured to combine the error with one or more samples to provide an update signal, wherein the equalizer employs the update signal to adjust the equalizer response to the target response;
a maximum likelihood sequence estimation (MLSE) detector, the MLSE detector generating decoded data from the sequence of equalized samples, wherein the MLSE detector generates decoded data with an algorithm having transitions based on the target response; and

an accumulator configured to accumulate the square of each error value, wherein the accumulation of the squared error values relates to a parameter of the target response, and the algorithm adjusts its transitions by adaptation of the parameter of the target response.

27. (New) An apparatus for applying compensation to samples received from an optical channel comprising:

an equalizer having an equalizer response spectrally shaping the samples for compensation to generate a sequence of equalized samples;

an error generator generating an error for a current sample based on the difference between 1) an equalized current sample and 2) a decision for the current sample adjusted for a target response, wherein the target response is based on a response of the optical channel; and

a combiner configured to combine the error with one or more samples to provide an update signal, wherein the equalizer employs the update signal to adjust the equalizer response to the target response;

wherein the equalizer comprises a filter defined by a set of filter taps adapted in accordance with a recursive update rule, wherein the update rule is generated from a cost function.

28. (New) The invention as recited in claim 27, wherein the cost function is quadratic error and the update rule is generated from minimizing mean squared error of the cost function with respect to the filter tap.

29. (New) An apparatus for applying compensation to samples received from an optical channel comprising:

an equalizer having an equalizer response spectrally shaping the samples for compensation to generate a sequence of equalized samples;

an error generator generating an error for a current sample based on the difference between 1) an equalized current sample and 2) a decision for the current sample adjusted for a target response, wherein the target response is based on a response of the optical channel; and

a combiner configured to combine the error with one or more samples to provide an update signal, wherein the equalizer employs the update signal to adjust the equalizer response to the target response;

wherein:

the equalizer comprises a filter defined by a set of filter taps; and

the target response is of the form A+D, where A is a parameter ranging from about 0 to about 1, and D is a unit delay.

30. (New) An apparatus for applying compensation to samples received from an optical channel comprising:

an equalizer having an equalizer response spectrally shaping the samples for compensation to generate a sequence of equalized samples;

an error generator generating an error for a current sample based on the difference between 1) an equalized current sample and 2) a decision for the current sample adjusted for a target response, wherein the target response is based on a response of the optical channel;

a combiner configured to combine the error with one or more samples to provide an update signal, wherein the equalizer employs the update signal to adjust the equalizer response to the target response; and

an accumulator configured to accumulate the square of each error value, wherein the accumulation of the squared error values relates to a parameter of the target response, and the apparatus adapts the parameter of the target response during initialization of the apparatus.

31. (New) A method of applying compensation to samples received from an optical channel comprising the steps of:

(a) spectrally shaping, with an equalizer, the samples for compensation to generate a sequence of equalized samples;

(b) generating an error for a current sample based on the difference between 1) an equalized current sample and 2) a decision for the current sample adjusted for a target response, wherein the target response is based on a response of the optical channel;

(c) combining the error with one or more samples to provide an update signal;

(d) updating the equalizer with the update signal to adjust the equalizer response to the target response; and

(e) generating decoded data from the sequence of equalized samples with maximum likelihood sequence estimation (MLSE) detection, wherein step (e) generates decoded data with an algorithm having transitions based on the target response;

(f) accumulating the square of each error value, wherein the accumulation of the squared error values relates to a parameter of the target response; and

(g) adjusting the transitions by adaptation of the parameter of the target response.

32. (New) A method of applying compensation to samples received from an optical channel comprising the steps of:

(a) spectrally shaping, with an equalizer, the samples for compensation to generate a sequence of equalized samples;

wherein step (a) comprises the step (a1) of filtering based on a set of filter taps; and

wherein step (a1) includes the step of adapting the set of filter taps in accordance with a recursive update rule based on a cost function;

(b) generating an error for a current sample based on the difference between 1) an equalized current sample and 2) a decision for the current sample adjusted for a target response, wherein the target response is based on a response of the optical channel;

(c) combining the error with one or more samples to provide an update signal; and

(d) updating the equalizer with the update signal to adjust the equalizer response to the target response.

33. (New) The invention as recited in claim 32, wherein the cost function is quadratic error and the update rule is generated from minimizing mean squared error of the cost function with respect to the filter tap.

34. (New) A method of applying compensation to samples received from an optical channel comprising the steps of:

(a) spectrally shaping, with an equalizer, the samples for compensation to generate a sequence of equalized samples;

wherein step (a) comprises the step (a1) of filtering based on a set of filter taps;

(b) generating an error for a current sample based on the difference between 1) an equalized current sample and 2) a decision for the current sample adjusted for a target response, wherein the target response is based on a response of the optical channel;

wherein, for step (b) the target response is of the form A+D, where A is a parameter ranging from about 0 to about 1, and D is a unit delay;

(c) combining the error with one or more samples to provide an update signal; and

(d) updating the equalizer with the update signal to adjust the equalizer response to the target response.

35. (New) A method of applying compensation to samples received from an optical channel comprising the steps of:

(a) spectrally shaping, with an equalizer, the samples for compensation to generate a sequence of equalized samples;

(b) generating an error for a current sample based on the difference between 1) an equalized current sample and 2) a decision for the current sample adjusted for a target response, wherein the target response is based on a response of the optical channel;

(c) combining the error with one or more samples to provide an update signal;

(d) updating the equalizer with the update signal to adjust the equalizer response to the target response;

(e) accumulating the square of each error value, wherein the accumulation of the squared error values relates to a parameter of the target response; and

(f) adapting the parameter of the target response during initialization of the apparatus.